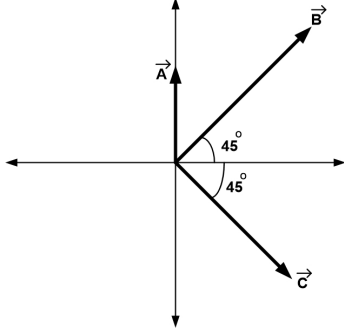
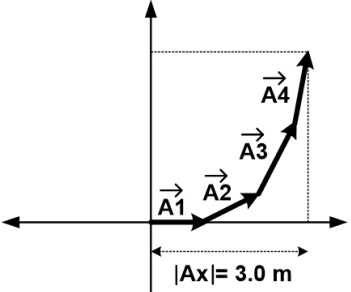
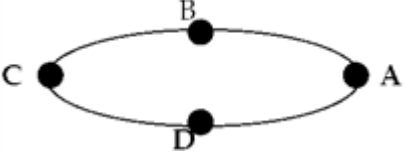
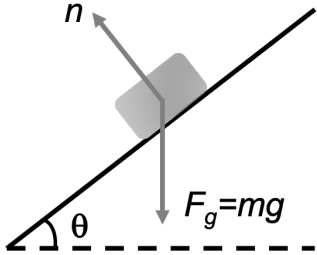
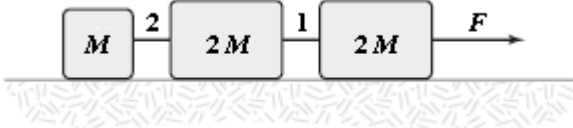
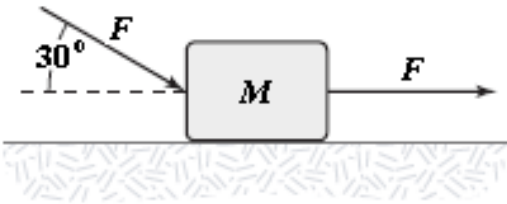


Take $g = 9.8 \text{ ms}^{-2}$ wherever needed

Q	Multiple choice questions
1	<p>Which of the following quantities contains all three basic dimensions of mechanics?</p> <p>A) displacement B) velocity C) acceleration D) force</p>
2	<p>Considering the motion of a particle, which of the following quantities have always the same direction?</p> <p>A) displacement and velocity B) velocity and acceleration C) acceleration and displacement D) all of the previous</p>
3	<p>An object moves along the x-axis according to the expression $x = 5 + 9t - 7t^2$, where x is in meters and t is in seconds. At $t = 4.0 \text{ sec}$, the acceleration of the object will be:</p> <p>A) 2 ms^{-2} B) -5 ms^{-2} C) 7 ms^{-2} D) -14 ms^{-2}</p>
4	<p>A stone is thrown straight downward with an initial speed of 9.0 m/s from the roof of a 45.0 m tall building. The time taken by the stone to touch the ground is:</p> <p>A) 1.8 s B) 2.25 s C) 3.32 s D) 4.9 s</p>
5	<p>If $\vec{A} = 20.0 \text{ m}$, $\vec{B} = 40.0 \text{ m}$, and $\vec{C} = 30.0 \text{ m}$, then what is the magnitude of the sum of these three vectors?</p> <div style="text-align: right;">  </div> <p>A) 56.4 m B) 25.7 m C) 192.8 m D) 72.6 m</p>
6	<p>If $\vec{A} = 2\hat{i} + 2\hat{j}$, and $\vec{B} = 2\hat{i} - 4\hat{j}$, then what is the angle that the sum vector $(\vec{A} + \vec{B})$ makes with the positive x-axis?</p> <p>A) 90° B) -19° C) -27° D) 42°</p>

7	<p>If $\vec{A} = \vec{A1} + \vec{A2} + \vec{A3} + \vec{A4}$, $\vec{A} = 5.0 \text{ m}$, and the x-component of the resultant vector is $\vec{Ax} = 3.0 \text{ m}$, then what is the angle that the resultant vector \vec{A} makes with the positive x-axis?</p>	
8	<p>If the component of vector \vec{A} along the direction of vector \vec{B} is zero, what can you conclude about the two vectors?</p> <p>A) The two vectors are parallel to each other B) The two vector makes 45° with each other C) The two vectors are perpendicular to the x-axis D) The two vectors are perpendicular to each other</p>	
9	<p>At $t = 0$, a particle leaves the origin with a velocity of 9.0 m/s in the positive y direction and moves in the xy plane with a constant acceleration of $(2 \hat{i} - 4 \hat{j}) \text{ m/s}^2$. At the instant the x coordinate of the particle is 15.0 m, the speed of the particle is:</p> <p>A) 10 m/s B) 12 m/s C) 14 m/s D) 16 m/s</p>	
10	<p>Two projectiles are launched at 100 m/s, the angle of elevation for the first being 30° and for the second 60°. Which of the following statements is correct?</p> <p>A) The projectiles do not have the same acceleration while in flight. B) Both projectiles have the same range. C) The first projectile has the lower speed at maximum altitude. D) The second projectile has the lower range.</p>	
11	<p>A ball is launched from ground level at 18.0 m/s at an angle of 36° above the horizontal. How far does it go before it is at ground level again?</p> <p>A) 14 m B) 31 m C) 22 m D) 86 m</p>	
12	<p>An object moving at a constant speed requires 6.0 sec to go once around a circle with a diameter of 4.0 m. What is the magnitude of the centripetal acceleration of the particle during this time?</p> <p>A) 2.2 m/s² B) 3.3 m/s² C) 3.9 m/s² D) 4.4 m/s²</p>	

13	<p>A particle moves along a circular path having a radius of 2.0 m. At an instant when the speed of the particle is equal to 3.0 m/s and changing at the rate of 5.0 m/s^2, what is the magnitude of the total acceleration of the particle?</p> <p>A) 9.5 m/s^2 B) 6.0 m/s^2 C) 5.4 m/s^2 D) 6.7 m/s^2</p>
14	<p>A car travels around an oval racetrack (مضمار سباق بيضاوي) at constant speed. The car is accelerating:</p>  <p>A) at all points except B and D B) at all points except A and C C) everywhere, including points A, B, C, and D D) nowhere, because it is traveling at constant speed</p>
15	<p>A box of mass m is placed on an inclined frictionless plane as shown in the Figure. The magnitude of the normal force on this inclined plane:</p>  <p>A) equals mg B) is less than mg C) is greater than mg D) equals $2mg$</p>
16	<p>The horizontal surface on which the objects slide is frictionless. If $M = 2.0\text{ kg}$, and the tension in string 1 is 12 N. The magnitude of the pulling force F is:</p>  <p>A) 25 N B) 18 N C) 20 N D) 35 N</p>

17	<p>The horizontal surface on which the block slides is frictionless. If $F = 20 \text{ N}$ and $M = 5.0 \text{ kg}$, what is the magnitude of the resulting acceleration of the block?</p>  <p>A) 5.3 m/s^2 B) 6.0 m/s^2 C) 7.5 m/s^2 D) 3.2 m/s^2</p>
18	<p>A 25.0 kg block is initially at rest on a horizontal surface. A horizontal force of 75.0 N is required to set the block in motion. After it is in motion, a horizontal force of 60.0 N is required to keep the block moving with constant speed. The coefficients of static and kinetic friction are respectively:</p> <p>A) 0.306 and 0.245 B) 0.35 and 0.20 C) 0.100 and 0.252 D) 0.30 and 0.4</p>
19	<p>A car is travelling at 90 km/h on a horizontal highway on a rainy day corresponding to a coefficient of static friction close to 0.1 between the road and the tires. After breaking, it will need a certain distance d to come to a stop. What is true?</p> <p>A) On a sunny day the coefficient of static friction will be smaller than 0.1 B) On a sunny day, the stopping distance will be larger than d C) None of those D) On a sunny day, the stopping distance will be smaller than d</p>
20	<p>A 20.0 kg box is pulled at constant speed by a rope that makes an angle θ with the horizontal. The pulling force is 35.0 N and the friction force on the box is 20.0 N. The angle θ is:</p> <p>A) 22.2° B) 80.1° C) 90.1° D) 55.2°</p>